

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Office Action dated August 24, 2005 (U.S. Patent Office Paper No. 0805). In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

As outlined above, claims 2 and 11-19 stand for consideration in this application, while claims 1 and 3-10 are being canceled without prejudice or disclaimer, and claims 2 and 11 are being amended to more particularly point out and distinctly claim the subject invention. Support for the amendments may be found throughout the specification, including but not limited to page 12, line 7 to page 13, line 8; page 14, lines 7-25; and page 16, lines 8-25. Applicant hereby submits that no new matter is being introduced into the application through the submission of this response.

Formal Objections or Rejections

The Examiner objected to the Title of the Invention as not being descriptive, and has requested correction thereof. However, as outlined above, the Title is being replaced as required by the Examiner.

Prior Art Rejections

The Examiner rejected claims 1, 3-4 and 6 under 35 U.S.C. § 102(e) on the grounds of being anticipated by U.S. Application No. 2004/0152245 to Madurawe. Also, the Examiner rejected claims 2, 7-10, 11-13 and 15-19 under 35 U.S.C. §103(a) as being unpatentable over Madurawe '245 in view of U.S. Patent No. 6,060,755 to Ma et al.

Further, the Examiner rejected claim 5 under 35 U.S.C. §103(a) as being unpatentable over Madurawe '245 in view of U.S. Patent No. 5,847,419 to Imai et al., and claim 14 as being unpatentable over Madurawe '245 in view of Ma '755 and further in view of Imai '419. Applicants have carefully reviewed the above rejections, and hereby respectfully traverse.

The present invention as recited in claim 2 is directed to an accumulation-mode semiconductor device comprising: a SOI substrate having a surface monocrystalline silicon layer and an insulating layer formed on a base substrate; a source diffusion portion and a

drain diffusion portion both having a first conductive type formed in the surface monocrystalline silicon layer of the SOI substrate; a channel portion also formed of the first conductive type and having one end adjacent to the source diffusion portion and the other end adjacent to the drain diffusion portion and a gate insulating film formed on the channel portion. The gate insulating film is a laminated film comprising an insulating film formed on the channel portion and a metal oxide film having a higher dielectric constant than the insulating film.

As recited in claim 11, the present invention is directed to an accumulation-mode semiconductor device comprising: a SOI substrate having an insulating layer and a surface monocrystalline silicon layer formed on a base substrate; at least one separation area made from an insulating material formed in the SOI substrate; a first area in which a source diffusion portion and a drain diffusion portion both having a first conductive type are formed in the surface monocrystalline silicon layer of the SOI substrate bounded by the separation area; a second area which is adjacent to the first area and adjacent to the separation area and in which opposite type source and drain diffusion portions having an opposite conductive type to the first conductive type are formed. A gate insulating film is formed on a channel portion having one end adjacent to the source diffusion portion and the other end adjacent to the drain diffusion portion in the first and second areas. The gate insulating film comprises a laminated film of an insulating film formed on the channel portion and a metal oxide film having a higher dielectric constant than the insulating film, and the channel portion of the first area has the first conductive type and the channel portion of the second area has the second conductive type.

Among the main features of the present invention, the accumulation-mode semiconductor device incorporates, among other features, a channel portion formed of a first conductive type and having one end adjacent to a source diffusion portion and the other end adjacent to a drain diffusion portion and a gate insulating film formed on the channel portion, wherein the gate insulating film is a laminated film comprising an insulating film formed on the channel portion and a metal oxide film having a higher dielectric constant than the insulating film.

Applicants have found that an accumulation-mode device having such a structure is formed with a channel that is deeper than the channel in an inversion mode device, and is less susceptible to reductions in mobility resulting from remote charge scattering by the fixed charge existent in the high-dielectric gate insulating film than devices using a silicon dioxide

gate insulation film. In other words, a SOI device which comprises a high-dielectric gate insulating film and operates in an accumulation mode, as in the invention, is a device which is hardly affected by the scattering of remote charge caused by the fixed charge existent in the gate insulating film, can achieve high mobility and a reduction in its EOT and can reduce a leak current by two to four digits as compared with when a silicon dioxide gate insulating film is used (see page 16, lines 17-24).

Applicants will contend that neither Madurawe '245, nor Ma '755, nor Imai '419 discloses or suggests at least the features of the present invention as claimed and as discussed above. In particular, none of the cited references show or suggest an accumulation-mode semiconductor device that incorporates, among other features, a channel portion formed of a first conductive type and having one end adjacent to a source diffusion portion and the other end adjacent to a drain diffusion portion and a gate insulating film formed on the channel portion, wherein the gate insulating film is a laminated film comprising an insulating film formed on the channel portion and a metal oxide film having a higher dielectric constant than the insulating film. Rather, the cited references are directed to conventional devices that do not incorporate a structure nor operate in a manner similar to those of the present invention, and thus cannot achieve the same features and advantages as those of the present invention.

The present invention as a whole as claimed is distinguishable and thereby allowable over the prior art of record.

Conclusion

In view of all the above, Applicant respectfully submits that certain clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references upon which the rejections in the Office Action rely. These differences are more than sufficient that the present invention as now claimed would not have been anticipated nor rendered obvious given the prior art. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application as amended is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicant's undersigned representative at the address and phone number indicated below.

Respectfully submitted,

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